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Comparison of Canadian and San Francisco syncope rules in patients admitted to emergency department with syncope

Yunus Emre Erdoğan, Muhammet Yavuz Şeker, Şerife Gül Gündüz, Nurhayat Başkaya, Rohat Ak*, Avni Uygar Seyhan

Department of Emergency Medicine, Kartal Dr. Lütfi Kırdar City Hospital, University of Health Sciences, İstanbul, Türkiye

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Corresponding Author: Rohat Ak, rohatakmd@gmail.com

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ABSTRACT

Aims: Syncope is the totality of symptoms in which consciousness is temporarily lost and postural tonus cannot be maintained, which resolves spontaneously and completely without any medical intervention. Although syncope has an important place among the reasons for admission to the emergency department, the diagnostic approach and what should be done in terms of discharge have not yet been fully systematized. In this study, a comparison was made according to age, gender, known diseases, and San Francisco and Canadian syncope rules.

Methods: This is a single-center, retrospective cohort study. During the study period, the vital parameters, ECG, blood tests, and physical examination findings of the patients who presented to the emergency department with the complaint of fainting were evaluated. The number of points scored by the San Francisco and Canadian syncope criteria was determined for each patient. It was stated which of the discharge, hospitalization in the ward, intensive care unit, and ex results each patient ended with. Each patient was investigated after 30 days, and it was investigated whether there were any of the negative results we wrote above within 30 days. At the end of all these, the San Francisco and Canadian syncope criteria were compared with the analysis method.

Results: The study included 449 patients, of whom 52.1% were male and 47.9% were female, with a serious outcome rate of 10%, a readmission rate of 11.4%, and a mortality rate of 1.1%.

Conclusion: In this study, it was found that the rate of no adverse events was significantly higher when the San Francisco Syncope Rule were negative; the San Francisco Syncope Criteria and the Canadian Syncope Rule gave similar results in predicting mortality and morbidity; the Canadian Syncope Rule were slightly more effective in predicting morbidity and mortality.

Keywords: Clinical prediction rules, prognosis, risk stratification, syncope

INTRODUCTION

Syncope is defined as a sudden, transient loss of consciousness with an inability to maintain postural tone, followed by spontaneous recovery and a return to pre-existing neurologic function. It is a common clinical problem, accounting for 1-3% of emergency department (ED) admissions.[1]

The overall distribution of syncope is equal between men and women; however, women are more likely to experience syncope at older ages. Compared with people aged 50 to 59 years, the incidence increases two- and threefold in people aged 70 to 79 years and people aged 80 years and older, respectively. Older adults are more likely to have orthostatic, carotid sinus hypersensitivity, or cardiac syncope, whereas younger adults are more likely to have vasovagal syncope.[2] A significant proportion of patients with benign causes of syncope are admitted for inpatient evaluation. Therefore, risk stratification, which ensures safe discharge of patients with a low risk of serious outcomes, is important for effective management of patients in emergency departments and the reduction of costs associated with unnecessary diagnostic investigations.[1]

Patients with cardiovascular disease, an abnormal electrocardiogram, or a family history of sudden death who present with unexplained syncope should be hospitalized for further diagnostic evaluation. Patients with neural-mediated or orthostatic syncope usually do not require additional testing. Although a cohort of patients will have unexplained syncope despite undergoing a comprehensive evaluation, patients with multiple episodes are more likely to have a serious underlying disorder.[3] 3–5% of all syncope patients evaluated in the emergency department have been found to have a serious condition after emergency department admission.[4] Death, myocardial infarction, arrhythmia, pulmonary embolism, stroke, severe bleeding, or any condition that causes or may cause readmission to the emergency department and hospitalization for a related event is considered a serious outcome.[5-8]

The San Francisco Syncope Rule was created to predict adverse outcomes at 7 and 30 days.[9] Five risk factors, denoted

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by 'CHESS' in the San Francisco Syncope Rule, history of congestive heart failure, hematocrit <30%, abnormal findings on the ECG, shortness of breath, and systolic blood pressure <90 mmHg, were identified to predict patients at high risk of serious outcomes.[10] The Canadian Syncope Risk Score was developed as a clinical decision tool to identify adult patients with syncope at risk of a serious adverse event within 30 days of discharge from the emergency department. The Canadian Syncope Risk Score is calculated based on the presence of vasovagal symptoms, a history of heart disease, systolic blood pressure <90 or >180 mmHg, elevated troponin, an abnormal QRS axis, a corrected QT interval >480 ms, and a QRS duration >130 ms.[11-13] The aim of this study was to evaluate the San Francisco and Canadian Rules in terms of predicting poor outcomes in patients presenting to the ED with syncope. Also this study aims to not only compare the Canadian and San Francisco Syncope Rules but also to delve into their practical implications in clinical settings.

METHODS

This study is a single-center retrospective case study. The study was carried out with the permission of Clinical Research Ethical Committe of Kartal Dr. Lütfi Kırdar State Hospital (Date:30.06.2022, Decision No: 2022/514/228/7). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Patients over the age of 18 years who were admitted to the ED with loss of consciousness and fainting during the specified periods, after excluding the causes of loss of consciousness such as hypoglycemia, trauma, seizure, alcohol or substance intake, stroke, and the rest of the patients, were included in the study together with their findings in the Hospital Information Management System and the results of tests and examinations.

Study Inclusion Criteria

Patients over the age of 18 years who presented to the ED with fainting and blackout, whose tests and findings were registered in the system, and who did not meet the exclusion criteria, were included in the study.

Study Exclusion Criteria

Patients admitted to the ED with loss of consciousness but epilepsy, hypoglycemia, patients with ongoing neurological deficits suggestive of stroke, patients with CO intoxication, patients with high dose alcohol intake or any other suspected signs of intoxication, patients who refused to participate in the study, patients who could not be reached afterwards, and patients with missing data were excluded from the study.

Collection of Cases

We conducted a detailed analysis considering patient characteristics like age, gender, and known diseases to understand the effectiveness of these rules. Between 01.05.2022-01.09.2022, patients who presented to ED with the complaint of fainting and fainting were carefully selected. Patients with missing findings, documents, tests, and examinations from the past system were eliminated. The remaining patients were analyzed for age, gender, history of heart failure, hematocrit value, presence of abnormal ECG, presence of shortness of breath, systolic and diastolic blood pressure values; cardiac diseases such as atrial fibrillation, heart valve replacement, and history of coronary artery disease; whether the type of syncope described was vasovagal, cardiac, or neurological syncope; whether the troponin value was elevated or not; whether there was an abnormal QRS axis on the ECG; QRS duration; and corrected QT interval.

Abnormal ECG findings included ST segment elevation in the anterior (V1,V2,V3,V4) and inferior (D2,D3,AVF) leads, right and/or left bundle branch block, AF, Brugada pattern, T wave negativity, aneurysmatic changes, AV block, ventricular tachycardia (VT), pathologic Q wave, and sinus tachycardia.

Patients' diagnoses, inpatients ward/intensive care unit (ICU), or discharge information were also noted in the relevant field on the second page of the form. Patients' scores from the San Francisco Syncope Rules and Canadian Syncope Rules were marked in the relevant section of the form.

Patients and their relatives were contacted after 1 month if the patient was discharged, and it was learned whether the patient was readmitted, hospitalized in the ward, hospitalized in the intensive care unit, died, or had other serious conditions developed within 1 month, and it was written in the relevant section of the form.

Calculation of San Francisco and Canada Scores

SFSK consists of five parameters: HF history, abnormal ECG findings, Htc <30%, dyspnea, and SDB <90 mm Hg. Each parameter is 1 point, and patients with any of these parameters are classified as high-risk.

The Canadian Syncope Rule consist of 8 parameters: vasovagal symptoms, history of heart disease, HR >180 or <90, troponin value elevated or elevated during follow-up, QRS axis abnormal, QRS duration longer than 130 ms, corrected QT interval longer than 480 ms, and diagnosis of vasovagal or cardiac syncope. Each parameter has its own score, and -3,-2 points were considered very low risk, -1.0 points as low risk, 1,2,3 points as moderate risk, 4,5 points as high risk, and above 5 points as very high risk.

The history of heart failure was determined by asking the patient/relative whether they had previously been diagnosed with HF and whether they were taking medication for it.

Abnormal ECGs were evaluated. Abnormal ECGs were defined as ST segment elevation in anterior and inferior leads, right and/or left bundle branch block, AF, Brugada pattern, T wave negativity, aneurysmatic changes, AV block, VT, pathologic Q wave, and sinus tachycardia.

Shortness of breath: the presence of shortness of breath before syncope and/or at presentation was questioned. Since the assessment of dyspnea was subjective, care was taken to evaluate it meticulously in relation to the prodromal symptoms described by the patient and serious events such as chest pain. It was not associated with respiratory rate or oxygen saturation.

Systolic blood pressure: blood pressure was taken as the value measured by the triage nurse or nurses in the yellow and red area at the time of admission and recorded in the file.

Age: Official age records at the time of admission to our hospital were taken.

Hematocrit was taken as the Htc value in the complete blood count measured by the device in the biochemistry laboratory of our hospital from the blood sample taken at the time of admission.

Troponin elevation was based on the troponin hs value obtained from the blood sample taken at the time of admission

by the devices in the biochemistry laboratory of our hospital. A troponin hs value that was higher than normal or had a tendency to increase was considered positive.

Statistical Analysis

The SPSS version 25 statistical package program was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, frequency, minimum-maximum, percentage) were used to summarize the data. The Shapiro-Wilk test was used for normality tests of continuous variables, and the Mann-Whitney U test was applied for the difference between all two group averages since the normal distribution condition was not met. Fisher's exact test, which is used for two-group variables, was used for tests of independence between two categorical variables. ROC analysis was applied to reveal the power of the scores used in the study to determine the serious outcome of the patients. The significance level was taken as 0.05 for all tests performed.

RESULTS

The data of 449 patients admitted to ED with the complaint of 'fainting' were analyzed. Upon a more detailed evaluation, we observed distinct patterns in the performance of the Canadian and San Francisco Syncope Rules, especially when considering patient-specific factors such as underlying medical conditions and demographic variables. **Table 1** shows the characteristics of the 449 patients included in the study and the number and percentage distributions of the factors belonging to the two scores. The mean age of the patients was 51.46 years, and there was a balanced distribution of patients in terms of gender. It is understood that ECG abnormality is the most common factor in the San Francisco Syncope Score, while troponin elevation or increase, cardiac syncope diagnosis, and vasovagal symptoms are more common in the Canadian Syncope Risk Score. In addition, after these factors, a history of cardiac diseases was also found to be more common in some patients than others. The rate of serious outcomes was approximately 10%, readmission was 11.4%, and mortality was 1.1%.

In **Table 2**, the risk distribution of the patients as a result of the classification of the patients according to the San Francisco Syncope Score and the Canadian Syncope Risk Score is given with numbers and ratios. According to the results, it is seen that some of the patients classified as low risk according to the San Francisco Syncope Score were classified as moderate risk according to the Canadian Syncope Risk Score, and some of the patients classified as non-low risk were in the moderate risk group. It is understood that more detailed risk grading can be made according to the Canadian Syncope Risk Score.

Table 2. Risk distribution of the patients according to the classification of the San Francisco Syncope Score and the Canadian Syncope Risk Score

San Francisco Syncope Score	Low risk	Not low risk			
Number (percentage)	313 (69.7)	136 (30.3)			
Canadian Syncope Risk Score	**Very low risk**	**Low risk**	**Moderate risk**	**High risk**	**Very high risk**
Number (percentage)	84 (18.7)	190 (42.3)	101 (22.5)	46 (10.2)	28 (6.2)

Table 3 shows the number and percentages of outcomes according to the factors and other characteristics of the scores obtained from the patients. The percentages given are based on the number of patients belonging to the respective outcome. For example, out of a total of 5 patients who died, 2 and 40%, had heart failure. According to the percentages, it is clear that a high proportion of patients, especially those admitted to intensive care, had serious problems with heart disease.

Table 1. Characteristics of the patients and distribution of the factors of the two scores

Patient Characteristics	Patient count (n=449)
Demographics	
Age, mean (SD)	51.46 (0.96)
Min-max	0-92
Gender, number (percentage)	
Female	264 (52.1)
Male	215 (47.9)
SAN FRANCISCO SYNCOPE FACTORS, number (percent)	
Heart failure	35 (7.8)
Hematocrit <30	24 (5.3)
ECG Abnormality	90 (20)
Systolic blood pressure <90 mmHg	13 (2.9)
Shortness of breath	5 (1.1)
CANADA SYNCOPE FACTORS, number (percentage)	
Vasovagal symptoms	96 (21.4)
History of heart disease	83 (18.5)
Systolic blood pressure <90 mmHg or >180 mmHg	31 (6.9)
Troponin elevation or increase	100 (22.3)
Qrs axis <-30 or >100	52 (11.6)
Qrs duration of more than 130 ms	26 (5.8)
Qt distance greater than 480 ms	47 (10.5)
Diagnosis of vasovagal syncope	74 (16.5)
Diagnosis of cardiac syncope	98 (21.8)
Medical condition	
Atrial fibrillation	33 (7.3)
History of heart valve replacement	10 (2.2)
History of coronary artery disease	81 (18)
Termination or reapplication	
Serious outcome	46 (10.2)
Outcome	
Discharged	405 (90.2)
Inpatients ward	24 (5.3)
Intensive care	6 (1.3)
Mortality	5 (1.1)
Readdmission	51 (11.4)

Associations between the San Francisco Syncope Score and its factors

The relationships between the San Francisco Syncope Score and its factors were investigated by applying Fisher's Exact Tests. According to the p values given in **Table 4**, which are less than 0.05, the relationships between the San Francisco Syncope Score and its factors are significant. For each factor, it is understood that if the factor is present in the patient, the score indicates a non-low risk. In shortness of breath, this rate is slightly lower than the others.

Table 3. Distribution of outcomes according to factors related to scores and other characteristics

	Outcome, number (percentage)					
Variables	**Discharged (n=405)**	**Inpatients Ward (n=24)**	**Intensive care (n=6)**	**Mortality (n=5)**	**Other (n=9)**	**Total (n=449)**
Heart failure	29 (7.16)	2 (8.33)	2 (33.33)	2 (40.00)	0 (0)	35 (7.80)
Hematocrit <30	15 (3.70)	4 (16.70)	2 (33.33)	3 (60.00)	0 (0)	24 (5.35)
ECG abnormality	68 (16.79)	10 (41.67)	6 (100)	3 (60.00)	3 (33.33)	90 (20.04)
Systolic blood pressure <90 mmHg	10 (2.47)	1 (4.17)	0 (0)	2 (40.00)	0 (0)	13 (2.90)
Shortness of breath	5 (1.23)	0 (0)	0 (0)	0 (0)	0 (0)	5 (1.11)
Vasovagal symptoms	92 (22.72)	0 (0)	0 (0)	1 (20.00)	3 (33.33)	96 (21.38)
History of heart disease	72 (17.18)	6 (25.00)	3 (50.00)	2 (40.00)	0 (0)	83 (18.49)
Systolic blood pressure <90 mmHg or >180 mmHg	26 (6.42)	4 (16.67)	0 (0)	1 (20.00)	0 (0)	31 (6.90)
Troponin elevation or increase	76 (18.77)	12 (50.00)	5 (83.33)	5 (100)	2 (22.22)	100 (22.27)
Qrs axis <-30 or >100	38 (9.38)	6 (25.00)	3 (50.00)	2 (40.00)	3 (33.33)	52 (11.58)
Qrs duration of more than 130 ms	20 (4.94)	3 (12.50)	2 (33.33)	0 (0)	1 (11.11)	26 (5.79)
Qt distance greater than 480 ms	38 (9.38)	4 (16.67)	3 (50.00)	1 (20.00)	1 (11.11)	47 (10.47)
Diagnosis of vasovagal syncope	71 (17.53)	0 (0)	0 (0)	0 (0)	3 (33.33)	74 (16.48)
Diagnosis of cardiac syncope	77 (19.01)	12 (50.00)	4 (66.67)	3 (60.00)	2 (22.22)	98 (21.83)
Atrial fibrillation	25 (6.17)	2 (8.33)	4 (66.67)	2 (40.00)	0 (0)	33 (7.35)
History of heart valve replacement	8 (1.98)	1 (4.17)	1 (16.67)	0 (0)	0 (0)	10 (2.23)
History of coronary artery disease	67 (16.54)	6 (25.00)	4 (66.67)	1 (20.00)	3 (33.33)	81 (18.04)
Termination or reapplication	20 (4.94)	23 (95.83)	6 (100)	1 (20.00)	1 (11.11)	51 (11.36)
Serious outcome	10 (2.47)	22 (91.67)	6 (100)	5 (100)	3 (33.33)	46 (10.24)

Table 4. Results of association tests between the San Francisco Syncope Score and its factors

		San Francisco Syncope Rule		
Factors	**Group**	**Low risk, number (percentage)**	**Non-low risk number (percentage)**	**p value**
Heart failure	No	312 (75.4)	102 (24.6)	0.000
	Yes	1 (2.9)	34 (97.1)	
Hematocrit <30	No	312 (73.4)	113 (26.6)	0.000
	Yes	1 (4.2)	23 (95.8)	
ECG Abnormality	No	309 (86.1)	50 (13.9)	0.000
	Yes	4 (4.4)	86 (95.6)	
Systolic blood pressure <90 mmHg	No	313 (71.8)	123 (28.2)	0.000
	Yes	0 (0)	13 (100)	
Shortness of breath	No	312 (70.3)	132 (29.7)	0.031
	Yes	1 (20.0)	4 (80.0)	

Associations between the Canadian Syncope Risk Score and factors

Table 5. Results of tests of association between the Canadian Syncope Risk Score and factors

Factors	**Group**	**Canadian Syncope Risk Score, mean (SD)**	**p value**
Vasovagal symptoms	No	1.62 (2.28)	0.000
	Yes	-1.84 (1.77)	
History of heart disease	No	0.27 (2.16)	0.000
	Yes	3.59 (2.64)	
Systolic blood pressure <90 mmhg or >180 mmgh	No	0.62 (2.42)	0.000
	Yes	4.35 (2.47)	
Troponin elevation or increase	No	-0.08 (1.82)	0.000
	Yes	4.24 (2.06)	
Qrs axis <-30 or >100	No	0.43 (2.25)	0.000
	Yes	4.33 (2.53)	
Qrs duration of more than 130 ms	No	0.60 (2.33)	0.000
	Yes	4.33 (2.53)	
Qt distance greater than 480 ms	No	0.45 (2.24)	0.000
	Yes	4.55 (2.58)	
Diagnosis of vasovagal syncope	No	1.53 (2.28)	0.000
	Yes	-2.42 (1.33)	
Diagnosis of cardiac syncope	No	-0.07 (1.77)	0.000
	Yes	4.27 (2.25)	

The relationships between the Canadian Syncope Risk Score and its factors were investigated by applying Mann-Whitney tests due to the lack of normality. According to the p values given in **Table 5**, which are less than 0.05, the relationships between the Canadian Syncope Risk Score and its factors are significant. It is understood that when vasovagal symptoms and vasovagal syncope diagnosis are "present" among the factors, the score is smaller than those who are not present, and when other factors are "present," the score has a larger mean.

Comparison of the San Francisco Syncope Score and the Canadian Syncope Risk Score

According to the cross-tabulation of the classes of the San Francisco Syncope Score and the Canadian Syncope Risk Score (**Table 6**), most of the patients in the low-risk group, according to the San Francisco Syncope Score, were classified as very low, low, and moderate risk by the Canadian Syncope Risk Score, while those in the non-low-risk group were classified as moderate, high, and very high risk by the Canadian Syncope Risk Score. It is seen that 45.54% of the patients classified as moderate risk with the Canadian Syncope Risk Score were classified as low risk with the San Francisco Syncope Score, and 54.56% were classified as non-low risk.

Table 6. Cross-tabulation of the San Francisco Syncope Score and the Canadian Syncope Risk Score by class

		Canadian Syncope Risk Score, number (percent)					
		Very low risk	**Low risk**	**Moderate risk**	**High risk**	**Very high risk**	**Total**
San Francisco Syncope Score	**Low risk**	76 (24.3)	171 (54.6)	46 (14.7)	18 (5.8)	2 (0.6)	313 (100)
	Not low risk	8 (5.9)	19 (14.0)	55 (40.4)	28 (20.6)	26 (19.1)	136 (100)
	Total	84	190	101	46	28	449

Table 7. Results of the ROC Curve Analysis of the San Francisco Syncope Score and the Canadian Syncope Risk Score

Score	Criteria	AUC	p value	AUC 95% Confidence Interval	Sensitivity (95% Confidence Interval)	Specificity (95% Confidence Interval)
San Francisco Syncope Score	>0	0.720	0.0001	0.675-0.760	69.57 (54.2 – 82.3)	74.19 (69.6 – 78.4)
Canadian Syncope Risk Score	>10	0.728	0.0001	0.638-0.794	67.39 (52-80.5)	72.95 (68.3-77.2)

ROC Curve Analysis

A ROC curve analysis was performed to investigate the extent to which the San Francisco Syncope Score and the Canadian Syncope Risk Score determine the serious outcome of patients. The size of the areas under the ROC curve for the San Francisco Syncope Score and the ROC curve for the Canadian Syncope Risk Score are 72.0% and 72.8%, respectively, and p values less than 0.05 indicate that both scores effectively determine serious outcomes. (**Table 7**) If the San Francisco Syncope Score is greater than zero, i.e., 1, and the Canadian Syncope Risk score is greater than 10, the patient is expected to have a serious outcome.

The sensitivity, which is the percentage of correctly identifying the patient with a serious outcome, and the specificity, which is the percentage of correctly identifying the patient without a serious outcome, are close to each other for the two scores.

According to the p values, the San Francisco Syncope Rule and the Canadian Syncope Risk Score are significantly associated with serious outcome and readmission (p values<0.05). When the San Francisco Syncope Rule indicates low risk, the rates of serious outcomes and no readmission are quite high. If the rule shows a non-low risk, the rates of serious outcomes and readmissions are higher compared to the low-risk status.

As the risk indicated by the Canadian Syncope Risk Score increases from very low to very high, the rates of serious outcomes and readmissions become progressively higher. Conversely, as the risk indicated by the score decreases, the rates of serious outcomes and no readmission increase.

The changes in gender with readmission, atrial fibrillation with serious outcome and readmission, coronary artery disease with serious outcome and readmission, and age with serious outcome and readmission were significant (p values <0.05).

Accordingly, it is seen that males readmitted at a higher rate than females, but gender did not affect the serious outcome. It is understood that the presence of atrial fibrillation increases both serious outcomes and readmission rates. Heart valve replacement was not a factor in increasing serious outcomes or readmissions. The presence of coronary artery disease increased both serious outcomes and readmission rates. Patients who had a serious outcome and readmission had a higher mean age than those who did not.

Gender, atrial fibrillation, heart valve replacement, and coronary artery disease were significantly associated with the risks indicated by the San Francisco Syncope Rule (p value<0.05). Accordingly, it is seen that men have a higher non-low risk rate than women. If patients have atrial fibrillation, heart valve replacement, and coronary artery disease, the rule shows a higher non-low risk. It is understood that gender, atrial fibrillation, heart valve replacement, and coronary artery disease are significantly associated with the risks shown by the Canadian Syncope Risk Score (p value<0.05).

Accordingly, it is seen that men are in higher risk groups than women. If patients have atrial fibrillation and coronary artery disease, the score indicates higher risk groups. In the presence of valvular heart valve replacement, the moderate and very high-risk ratios of the score increased, while the high-risk ratio remained almost the same.

DISCUSSION

In this study, we evaluated the San Francisco and Canada scores in order to safely discharge patients with syncope during the follow-up of patients with a prediagnosis of syncope. Our findings reveal notable differences in the effectiveness of the Canadian and San Francisco Syncope Rules, which could have significant implications for patient care. While our results align with some of the existing literature, they also highlight unique aspects of syncope management in emergency settings. This comprehensive analysis of both scoring systems reveals nuanced differences in their applicability to diverse patient groups, highlighting the need for a more personalized approach in syncope management. The detailed comparison of these rules in our study sheds light on their relative strengths and weaknesses, offering valuable insights for emergency physicians in choosing the most appropriate evaluation method. We investigated whether the patients encountered a serious outcome and whether the patients we discharged safely were readmitted and their mortal course was missed. 449 patients were included in the study. In this study, 52.1% of the patients were male and 47.9% were female. The rate of serious outcomes was 10%, readmission was 11.4%, and mortality was 1.1%.

In a survey conducted among physicians in North America, syncope was found to be the second most problematic problem in decision making.[14] It was found that the cause could not be determined in approximately half of the patients admitted to AS for syncope, and mortality was as high as 30% in this group.

In a study by Quinn et al. in which 684 syncope patients were evaluated, 59% of the patients were women, and the mean age was 62.1±22.3.[15] In a study involving 270 patients for the validation of risk scores in syncope patients, 54% of the patients were women, and the mean age was 59.5±24.3.[16] In our study, the mean age of the patients was 51.46 years, and 52% of the patients were women. Although the female-to-male ratio was close to each other in all three studies, the female ratio was higher.

Electrocardiography (ECG) is the gold standard in the diagnosis of syncope due to arrhythmias. Although its diagnostic value in patients with syncope is low (2-9%), it is recommended to be performed on every patient considering cost-effectiveness.[17] Almost all of the scoring systems used for risk classification include abnormal ECG findings (SFSR, CSRS, OESIL, EGSYS, and ROSE).

In our study, males were found to be in higher risk groups than females. If the patients had atrial fibrillation and coronary artery disease, the score indicated higher risk groups. In the presence of valvular heart valve replacement, the score increased in the moderate and very high-risk groups, while the high-risk group remained almost the same.

In our study, it was understood that ECG abnormality is the most common factor in the San Francisco Syncope Score, while troponin elevation or increase, cardiac syncope diagnosis, and vasovagal symptoms are more common in the Canadian Syncope Risk Score. In addition, after these factors,

a history of cardiac diseases was also seen more frequently in patients than others.

Among the risk classification scores available in the literature for predicting adverse outcomes in patients presenting to the emergency department with syncope, the SFSK is the only score that includes all short-term adverse outcomes, has been prospectively created according to the methodological standards of clinical prediction rules, and has been validated in more than one study (circumstantial evidence), so it has been stated that its use in AS is appropriate.[18-20] However, it has also been stated that validation studies conducted later did not obtain as good results as in previous studies.[21,22]

In a study applying the San Francisco Syncope Rule, 791 patients presenting to the emergency department with syncope were followed up for 30 days. Serious outcomes occurred in 6.7% of patients (n=53) during follow-up. As a result of this study, the sensitivity and specificity of the San Francisco Syncope Rules were found to be 98% and 56%, respectively.[12] In our study, the sensitivity and specificity of the San Francisco Syncope Rules were found to be 69.7% and 74.19%, respectively. Although the sensitivity was significantly lower, 95.5% of patients who received low risk from the San Francisco Syncope Rules had no serious outcome, and 92.8% were not readmitted to the hospital.

In our study, when the San Francisco Syncope Rule shows low risk, the rates of serious outcomes and readmissions are quite high. If the rule shows non-low risk, it is understood that the rates of serious outcomes and readmissions are higher than the low-risk status. Our study underscores the importance of tailored approaches in syncope management, considering patient-specific factors.

In a very large series study (4033 patients), Canadian syncope risk scores showed a 30-day serious outcome. About 1% or less of very low-risk and low-risk Canadian Syncope Risk Score patients, about 20% of high-risk Canadian Syncope Risk Score patients, and about 50% of very high-risk Canadian Syncope Risk Score patients experienced serious 30-day outcomes.[13] In our study, 2.4% of very low-risk patients and 6.3% of low-risk patients experienced serious outcomes from the Canadian Syncope Risk Score; 21.7% of high-risk patients and 35.7% of very high-risk patients experienced serious outcomes. The limitations of our study point to the need for further research in diverse patient populations and over extended periods.

CONCLUSION

This study contributes to a more nuanced understanding of syncope management, emphasizing the need for adaptable diagnostic strategies in emergency departments. It is understood that as the risk indicated by the Canadian Syncope Risk Score increases from very low to very high, the rates of serious outcomes and readmission gradually increase. Conversely, as the risk indicated by the score decreases, the rates of serious outcomes and no readmission increase.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Clinical Researches Ethical Committe of Kartal Dr. Lütfi Kırdar State Hospital (Date:30.06.2022, Decision No: 2022/514/228/7). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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